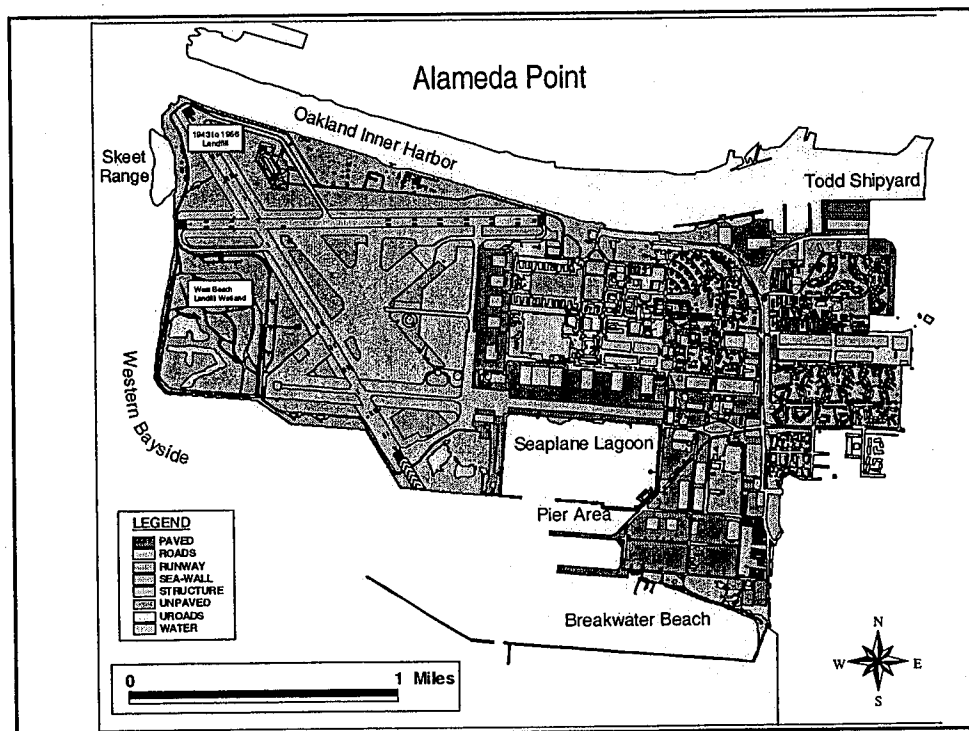
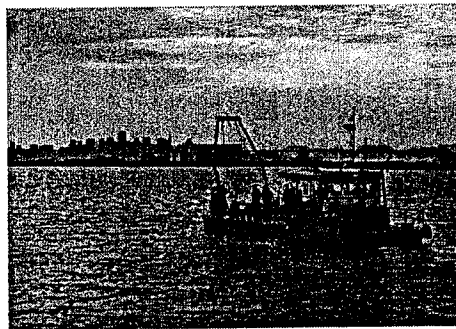


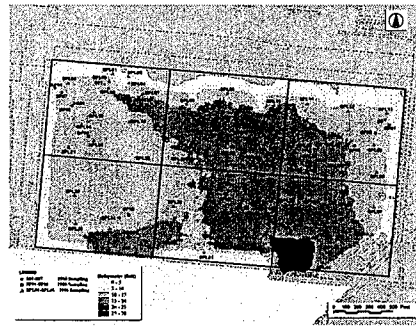
Alameda Point Seaplane Lagoon Remedial Investigation Overview

RAB Meeting
February 4, 2003



Seaplane Lagoon History

- Primarily source of historical contamination is through discharge of industrial wastewater via the storm drain system from 1940s to 1975
- Highest contamination found in the northeast and northwest corners of the lagoon at 4" to 2 feet below the sediment surface
- Contaminants of concern include heavy metals, pesticides, radionuclides, and PCBs



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Objectives of RI

- Describe the nature and extent of sediment contamination
- Present the methods and results of the ecological and human health risk assessment
- Delineate areas that pose an unacceptable risk to human health and the environment and require evaluation in the Feasibility Study (FS)
- Propose preliminary remediation goals (PRGs) for sediment that are health-protective of human and ecological receptors

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RI Methodology

Use Historical PRC/TtEMI Sediment Data (1994, 1996, and 1998), Macoma Tissue (1994, 1998) and Forage Fish Tissue (2001)

Conduct ERA

Conduct HHRA

Develop Footprint

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graph TD; A[Use Historical PRC/TtEMI Sediment Data (1994, 1996, and 1998), Macoma Tissue (1994, 1998) and Forage Fish Tissue (2001)] --> B[Conduct ERA]; A --> C[Conduct HHRA]; B --> D[Develop Footprint]; C --> D;
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Ecological Risk Assessment

In accordance with US EPA and Navy Guidance, the ERA was conducted following a two-tiered process:

- Screening-level ERA (SLERA) – screening based on conservative benchmarks (ERL) and exposure assumptions
- Baseline ERA (BERA) – use site-specific exposure assumptions and refined exposure concentrations

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SLERA

- Develop Conceptual Site Model
 - Benthic invertebrates (e.g., worms, shrimp, clams) exposed through ingestion and direct contact with sediment
 - Fish and birds (benthic feeding and piscivorous) ingesting sediment and prey that comes in contact with COPECs at Seaplane Lagoon
- Identify COPECs
 - 20 inorganics and 59 organics identified based on comparisons to benchmarks (e.g., ERLs)
 - Radionuclides
- Determine Hazard Quotients Using Conservative Assumptions
 - Receptors include scoter, juvenile and adult least terns, and double-crested cormorants
 - Assumed ingestion of maximum sediment, macoma (clams) and forage fish tissue concentrations
 - Using ecological PRGs, cadmium, lead, total 4,4'-DDx, and total PCBs had HQs greater than 1.0 for all receptors
 - No significant risks associated with exposure to radionuclides

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BERA

- Refine COPEC screen
 - Statistical comparisons to ambient levels
 - Nondetects and chemicals not detected in tissue were eliminated
- Assess Effects to Receptors
 - Benthic invertebrates community
 - No relationship was found between toxicity of sediment to benthic invertebrates and sediment chemistry
 - Low potential for risk to benthic community
 - Piscivorous fish community
 - Forage fish tissue concentrations compared to literature-derived forage fish PRGs
 - Cadmium was the only compound considered a risk driver to fish based on exceedances above forage fish PRGs
 - Avian community
 - Using refined exposure assumptions, range of SUF, and 95% UCL of the mean for chemical concentrations, risks to the receptor were recalculated
 - No HQ exceeded 1 for scoter
 - HQs >1 for cormorant, but concentrations at SPL were consistent with reference levels
 - HQs for total 4,4'-DDx, cadmium, and total PCBs are > 1 for least terns based on forage fish tissue

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Summary of ERA

- Low potential risks to benthic invertebrates based on relevant bioassay studies
- Cadmium is the only COPEC that potentially poses risk to forage fish in Seaplane Lagoon
- Little risk is posed to benthic-feeding birds (surf scoter) or to piscivorous birds such as the cormorant based on the risk assessment.
- The least tern is the most sensitive avian receptor evaluated with HQ>1 for cadmium, total 4,4'-DDx and total PCBs.

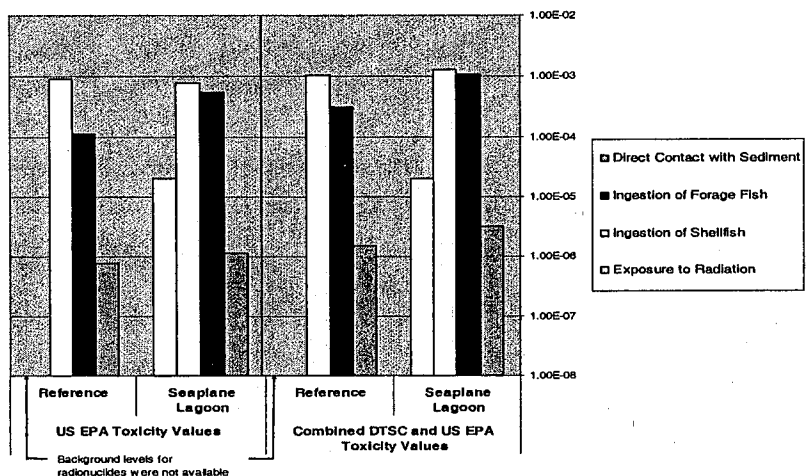
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Human Health Risk Assessment

- Exposure Assessment
 - Adult only exposures for RME and CTE scenarios
 - Complete exposure pathways include direct contact with sediment, ingestion of shellfish, and ingestion of forage fish
 - For radionuclides, exposure through ingestion of sediment and external radiation
- Toxicity Assessment
 - US EPA Toxicity only
 - Combined US EPA and DTSC Toxicity Values
- Risk Characterization

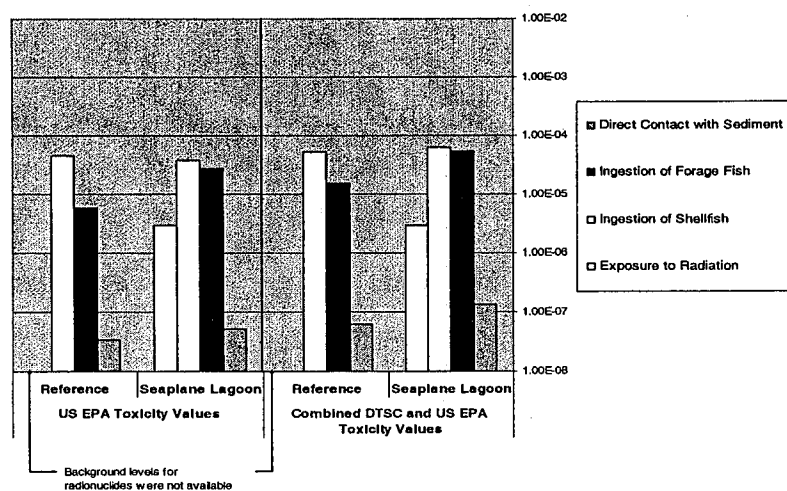
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Summary of RME Risk



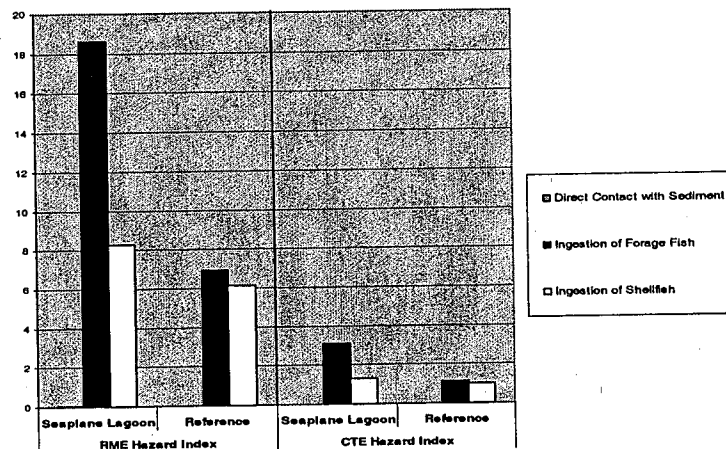
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Summary of CTE Risks



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Summary of Hazard Index



Note: Hazard associated with direct contact with sediment is less than 1.0

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Conclusions of HHRA

- Risks at SPL were slightly higher than reference for the direct contact and ingestion of forage fish pathway
- Risks from direct contact were within US EPA's risk management range (10^{-4} to 10^{-6})
- Risk from ingestion of shellfish were consistent with reference risks
- Risk drivers included arsenic, chromium, and total PCBs; however, both arsenic and chromium are naturally occurring and consistent with ambient levels.
- Risk from radionuclides are an order of magnitude below US EPA's Establishment of Cleanup Levels for CERCLA Site with Radioactive Contamination (3×10^{-4})

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Development of Feasibility Footprint

■ Ecological Footprint

- Cadmium PRG developed for protection of young and adult forage fish
- PRGs for cadmium, total PCBs, and total 4,4'-DDx were backcalculated to derive safe sediment concentration for protection of least terns.

■ Proposed PRGs for Protection of Ecological Receptors

COPEC	PRGs (mg/kg dry wt)		
	Fish		Avian
	Young	Adults	TRV _{LOW}
Cadmium	81.85	200	24.40
DDx	NA	NA	0.13
PCBs	NA	NA	1.13

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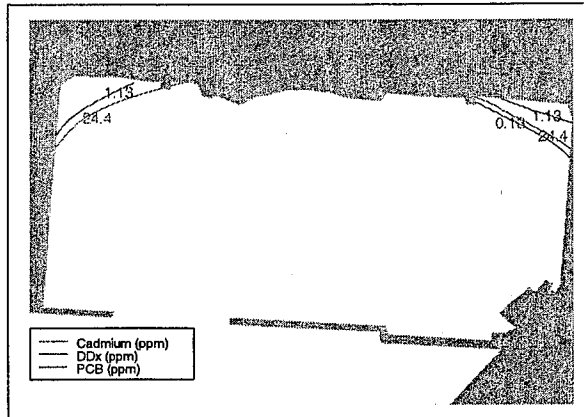
Development of Feasibility Footprint (cont'd)

■ Human Health Footprint

- Total PCBs was the only compound found elevated above ambient levels
- Elimination of the areas proposed for the ecological footprint would effectively eliminate potential risks to human receptors via direct and indirect exposure pathways.

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Proposed Remedial Footprint



PRGs of 24.4 mg/kg dry wt for Cd; 0.13 mg/kg DW for DDx; and 1.13 mg/kg DW for PCBs are proposed for the Feasibility Footprint

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Questions???

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